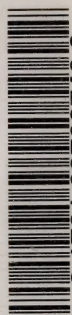


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THE CONFLICT OF SCIENCE AND RELIGION.

BY DR. EDWARD S. HOLDEN.

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THE CONFLICT OF RELIGION AND SCIENCE.

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“ Though all the winds of Doctrine were let loose to play upon the Earth, so Truth be in the field we do injuriously . . . to misdoubt her strength. Let her and falsehood grapple, who ever knew Truth put to the worse in a free and open encounter? ”—(Milton—Areopagitica).

THERE are many books that deal specifically with a supposed conflict between religion and science, or with a warfare between science and dogmatic theology. It is my conviction that the view-point of most books of the sort is badly chosen, and I desire in this preface to set forth briefly the reasons for thinking that the battle has often been joined on a wrong issue. The question is fundamental and deserves a much fuller treatment than can here be given. To make it entirely clear it might be necessary to reprint one of the warfare-of-science books with a commentary, meeting every argument as it arises; exhibiting and enforcing a different point of view; and proving that the change of view-point was reasonable and necessary. Lacking the space for extended argument, it is necessary to condense it. Indulgence is asked for a presentation that must necessarily be brief, but which can very readily be made more complete.

The mass of men believe that religion has come out vanquished, humiliated and discredited from a long warfare with triumphant science. One of the very wisest of ‘the martyrs of science’—Roger Bacon—has said ‘what the mass of men believe is necessarily false.’ The saying is harsh, and Bacon suffered for it. It is more true to say that few popular formulas are so exactly stated that a historian of science can accept them in their crude and current form. The popular doctrine as to the conflict in question undoubtedly needs amending.

Most books of the warfare-of-science sort are built more or less on the same plan. Let us take the case of the figure of the earth for an example. They often treat it in the following order: The primitive conception, that of a flat earth; early scientific ideas of its sphericity; opposition of the early church; evolution of a sacred theory drawn from the Bible; its influence on christian thought; survival of the idea of a spherical earth; contrast of the theological and scientific spirit; last outbursts of theological hostility; retreat of the church; final triumph of science over theology. Or, more briefly, their treatment may often be summarized thus: Science always right; theology always interfering; glory to us who have done away with superstition!

The real conflict of the ages has been between enlightenment and ignorance. Sometimes the battle has been in the field of theology; sometimes it has been in the field of science. The warfare has nearly always been between religion and heresy; or between science and pseudo-science; occasionally, but not very often, between religion and pseudo (or it may sometimes be true) science. Usually, however, the fields were plainly marked off. The theologians of any one epoch treated theological questions and only those. They were not even interested in scientific questions, as such. Men of science, before the time of Galileo and Bruno, did not meddle with religion. Each class kept to its own sphere.

But let us return to the question of the figure of the earth. Untutored man believed the earth to be flat; the sky to hang above it like a canopy; the stars to be fixed to the canopy (or to hang from it as the Arabs taught); the canopy to move from rising to setting, from east to west. Now, this was an entirely scientific theory. It accounted satisfactorily for every fact known to untutored man. A theory is perfect when a future phenomenon can be predicted beforehand as accurately as it can subsequently be observed. This was then, at the time, a perfect theory; it needed no apologies. Aristarchus and other Greeks saw that the observed phenomena (rising and setting of the stars) could be as well explained by a spherical earth that turned on its axis—as well, but no better. They did not know which theory was true. They had no means of deciding the point.

A matter of importance must be here alluded to. Long centuries of experience have taught us that there is one and only one solution to a scientific problem. We call such a unique solution a 'theory.' Anything less definite is a provisional 'hypothesis.' Now, the theories of the ancients were generally held by them primarily as hypotheses. Their whole attitude towards certainty was, in physical science, entirely different from ours. It has required all the centuries to teach us our lesson of implicit trust in scientific methods. Our trust is, in fact, in methods, not, primarily, in results. In general, a physical theory attributed to one of the ancients was held by him as we hold a hypothesis. It

might be so; it probably was so; but he was not ready to die for it.

The early fathers of the christian church took some one view, some another, of the shape of the earth. St. Augustine tolerated the scientific view, and said at the same time: "What concern is it to me [as a theologian, he meant] whether the heavens as a sphere enclose the earth at the middle of the world, or overhang it on either side?" It was a matter of almost no concern to the Bishop of Hippo at that time, in that place, under those conditions. The mission of the church in the fifth century was to civilize the teeming millions of pagans and barbarians. It was a mighty task. It was performed. It required the entire energy of all churchmen. It was of infinitely small importance, then, whether the barbarians were crowded together on a flat or on a spherical earth. The entire indifference of churchmen, then and later, to purely scientific matters is a fact to be kept in mind.

The theory of a flat earth was enforced from scripture in the sixth century by an Egyptian monk and traveler, Cosmas Indicopleustes. The warfare-of-science books all treat his theory as monkish (because it is wrong). But he was a great traveler and he was reputed scientific in his time. His theory agreed well enough with the simpler facts as he knew them, although it can not stand a moment in face of the facts as they are. Are we to blame him for ignorance? If so, who shall 'scape whipping? Is it a merit of ours that we happen to have been born since 1521, when Magellan's voyage of circumnavigation was completed?

The books in question tickle our vanity with a suggestion that our fortune of birth is somehow a merit. Our children 'know' that the earth is round; that England is an island. How? Because they have been told so. It rests on authority for them. Their elders have a better basis for belief. They know how to prove or to disprove these assertions. But how many of the elders can *prove* that the earth turns on its axis? It is not an easy matter, and here, in their turn, they rest on authority. How many of my readers can describe Foucault's pendulum experiment off-hand, or explain how a change of gravity with the latitude demonstrates the earth's rotation? Our predecessors in the middle ages rested on the best authority they could attain. Are they to be blamed because our centuries of experience were not behind them?

The implied conclusion of the warfare-books seems to be that our predecessors are to be blamed for lack of open-mindedness to scientific truths. Open-mindedness implies long experience. It is a product of past centuries. Until the centuries are, in fact, past, this virtue can not be evolved; nor can its opposite vice be atrophied except by time.

It is a pertinent fact that in the seventh century Isidore of Seville,

and in the eighth the venerable Bede, pronounced in favor of the earth's sphericity. After these two great doctors had spoken it was allowable for any churchman to follow them. That many did not is an incident in the warfare with ignorance, not an attack of religion upon science; and this conclusion is a point to be emphasized.

Lightfoot, vice-chancellor of the University of Cambridge, in the seventeenth century, declared that the scriptures taught that 'heaven and earth, center and circumference, were created all together, in the same instant,' and that 'this work took place and man was created by the Trinity on October 23, 4004 B. C., at nine o'clock in the morning.' It has been appositely remarked that a crowd of busy men, who had invented geometry and other sciences, were busily engaged in building pyramids in Egypt on this very October morning. The Bible does not explicitly give the foregoing, or any, date. If it did so, we might have a conflict between science and the Bible. Archbishop Usher in 1650 fixed a date by interpreting the Biblical words scientifically (not theologically). His scientific methods will not stand examination. Any modern Biblical scholar can show this. Have we here any signs of a conflict between religion and science? Not at all. In a scientific question a mistaken method was employed then, as so many times before and since. That an erroneous scientific result had a bearing on theological matters was incidental, not essential. The wild disorder of Jordano Bruno's systems of cosmic infinities, notably his guess that the stars were worlds, filled the mind of Kepler with horror. He expressly says that he shuddered with horror at the thought. It was precisely these new infinities of worlds that the Roman inquisitors found to be heretical. They had, without knowing it, the support of the great protestant astronomer. Kepler's horror for Bruno's ideas was no theological opposition. It was based on the best philosophy of the time. Like the Roman inquisitors, Kepler believed the universe to be finite. Can we wonder that the fugitive Dominican monk was tried and sentenced for heresy? Can we wonder that ideas from which the free-minded speculative Kepler recoiled were odious to a congregation of monks?

The cases so far examined are typical. Nearly every recorded instance of 'conflict' can be reduced to one or another of them. All are explicable as conflicts primarily with ignorance—and in that way alone.

Dante declared that hell was beneath the earth. Medieval textbooks answered the question: 'Why is the sun so red at sunset?' by declaring: 'because he looketh down upon hell.' This answer we know to be absurd; we even feel a flush of superiority to Dante and the middle age when the question is quoted; it is, apparently, sometimes quoted by the warfare-of-science books to produce this grateful glow; but not half the readers of this article can at once say what the

real answer is. The reply could not be completely given by any one until after the invention of the spectroscope in 1861—some forty years ago.

Copernicus taught the heliocentric theory—that the planets revolved about the sun, as we know that they do. In 1616 his books were placed upon the index, there to remain ‘until corrected.’ The action of the Congregation of the Index was an incident in the distressing history of Galileo. It was not taken, however, until the congregation had consulted leading astronomers and had obtained their verdict that the heliocentric theory was without foundation.* The pseudo-science of the Aristotelian professors (nearly all of whom were inimical to Galileo for personal as well as philosophical reasons) was opposed to the science of Copernicus. With this verdict in their minds it is not strange that the congregation should have proceeded against Galileo for heresy.

The system of Copernicus was proposed in 1543. It was true in its grand outlines; it was erroneous in many details. It was not *proved* till Galileo’s discoveries of 1610. Tycho Brahé, the greatest authority of his time, expressly rejected it as absurd, and proposed a new system of the world in 1587. Kepler rejected Tycho’s system and proposed his own first system (which was entirely erroneous) in 1597. He proposed his second system in 1609. How could theological doctors know that at last Kepler had reached the true system of the world by his glorious discoveries of 1609? His first theory was utterly without foundation. How could theologians, his contemporaries, possibly know that the second was not in like case? How could they know that he would not live to produce a third? Let us put ourselves in their place. What should we, being doctors of the church, ignorant of physical science, and profoundly indifferent to science as such, have done? Is it too much to conclude that our action would have been precisely that of the churchmen of that day? That we should have done precisely as the Romans did; as Luther, Melancthon and other protestants had earlier done? Kepler believed that all comets moved in straight lines; that the planets were sometimes repelled, sometimes attracted, by the sun; that each planet had a soul to guide it on its path; that all the planets sang together—Mercury, soprano; Venus, contralto; Mars, tenor; Jupiter and Saturn, bass. How much of all this was the church bound to accept? All of it is false. How could theological doctors possibly sift the false from the true?

The correspondence of Kepler and Galileo on the question of the tides is interesting in this connection. Kepler likens the earth to an animal, and the tides to its breathings and inbreathings, and says they follow the moon. Galileo laughs at him for this and declares that it is mere superstition to connect the moon with the tides. Ought the Roman church to have accepted Galileo’s dictum?

* This fact is omitted by the warfare-of-science books.

Let us, in order to make the whole question clearer, hark back to the middle ages. Contrasts are more strongly shown in their uncertain light. The thirteenth century possessed two thoroughly complete systems of science. One of them was worked out by Albertus Magnus with profound learning and at great length. It was a presentation of all the knowledge of the ancients enriched by the observations of the author. It was full of novelties. It stimulated, interested and instructed, and was in no important respect antagonistic to the current beliefs of his time. It was expounded, too, in a manner that inspired respect and won friendly recognition. The system of Roger Bacon was, on the other hand, hardy and original. It was set forth with a harsh arrogance that offended all the minds it was intended to convince. It was filled with diatribes against the pope, the cardinals, the Franciscans, the Dominicans, the clergy, the laity. It convicted Aristotle and the ancients of many faults. It pointed out errors in the writings of the fathers of the church and in the Vulgate. It exalted the morality of heathen philosophers like Seneca above the teachings of Christian preachers. It was, of course, not free from errors of its own. How could it be?

Both Albertus Magnus and Bacon, like all the men of their time, admitted astrology to a place among the sciences. Every one agreed that the stars influenced the destinies of individual men. Bacon went further and declared that the future of religious systems depended on conjunctions of the planets; that christianity would perish at a future conjunction of the moon with Jupiter! He believed in this insane folly with just the same sincerity as in his wonderfully intelligent and essentially correct theory of the rainbow; and he enforced it with like vigor.

The originality of Bacon's mind shocked the timid opinion of his time. The harshness of his character swept the earth free of friends. The errors of his astrology gave a handle to his enemies. In this matter they were more nearly right than he. Is it any wonder that he was disciplined and imprisoned by generals of the Franciscans, whom he had attacked; that the chapters of his order fully confirmed his sentences; that the popes approved them?

Was his fate the result of a warfare between religion and science? Let us consider the question closely. The doctrines of Bacon were condemned by the church, the true doctrines along with the false. Church dignitaries chose the Dominican friar, Albertus Magnus, as their representative rather than the Franciscan friar, Roger Bacon. We, to-day, after six centuries of struggle with ignorance, know that Bacon's system, as a whole, is wonderfully original, comprehensive, correct in method, fruitful in results. We entirely forget his errors; we are amazed at his profound intelligence. Great as Albertus was in his time, we, to-day, see that his contribution to the world's ideas is

small compared with that of his rival. How could the churchmen of the thirteenth century possibly know this? It has taken six centuries for us to learn it. Bacon's *Opus Majus* was first printed in its complete form in 1897—seven years ago, six centuries after his death.

His colleagues only knew that his brilliant and profound scientific ideas were too hard for them to follow. His theory of the rainbow, for instance, was not confirmed until the time of Descartes (1630). His correct theory of the Milky Way was not proved until 1610. His doctrine of 'species'—of the radiation of energies like gravitation—was not completed so as to be generally intelligible until the time of Huyghens, Hooke and Newton (1700). His conclusion that light is not propagated instantaneously, but takes time to pass from place to place, was not confirmed until the day of Roemer (1700). His guesses at the nature of heat could not have been understood or verified till the day of Count Rumford (1790). Bacon died in the year 1294.

How were his colleagues to judge of such profundities? They could not. But in looking through his scientific works they found that he held, with equal tenacity, a conclusion which they were entirely capable of judging. He declared that at a future conjunction of the moon and Jupiter the christian religion would perish. They believed their religion to be immortal. Bacon subjected a spiritual truth to material things; a divine institution to configurations and conjunctions of the planets. The first duty of institutions, states and individuals is self-preservation. For the church to accept Bacon's conclusions was sheer suicide. They were accordingly condemned. Along with the false the true suffered. It was an immense loss to the science of the middle ages and of the world that these things so fell out. But can it be wondered at? Were they, in any strict sense, the signs of a conflict between religion and science? The science that was especially condemned was false science; it was not true; it was, moreover, an attack on the very life of the church. Is not the whole episode just one step in the laborious, painful, slow, disheartening struggle between enlightenment and error—between illumination and ignorance? Must we not interpret the melancholy history of Jordano Bruno in the same way? Science had far less at stake in his case than in that of Bacon.

It may fairly be said, that up to the time of Galileo there never was, in any true sense, a conflict between religion and science. I am not here concerned to push the inquiry beyond this date of 1615. The controversies of the nineteenth century are, perhaps, of a different nature. During the earlier centuries there were endless warfares between one religion and another, between religion and heresy, between science and pseudo-science, but not between religion and science, as such. Looking backward, we now discover that the science of the nineteenth century would have been in conflict with the theology of the thirteenth. But in the thirteenth century itself, and

in every other century, the warfare was, in general, between religion and heresy—not science; between science and pseudo-science—not religion. The distinction is fundamental. It arises from the very constitution of man and the world he lives in.

From the time when primitive man first learned to light a fire until the present instant, there has been an increasing struggle between man and external nature; between man and the immaterial ignorances of his mind, also. Little by little, by slow steps, external and material nature has been subdued or circumvented in man's pursuit of comfort. Security and leisure, with their by-products, are the mile-stones along the tortuous path. Little by little the ignorances, anxieties and fears of man's spirit have been driven out, or, it may be, circumvented (one set of disquieting illusions sometimes being replaced by another) in his pursuit of spiritual happiness. Even material comfort has not yet been attained for society at large—witness the housing of the poor, and the death rate of young children—though we are far on the road towards it.

Veritable progress has been made on the road to spiritual happiness also. The spiritual welfare of a man is bound up in his beliefs—in his religion. To attack and unsettle the beliefs of any age is to threaten its happiness in a vital spot and such attacks are always vigorously repelled. A blow directed against ideals sincerely held hurts; and is resented. That they are ignorantly held does not lighten the blow. We have, to-day, partially—and only partially—learned the lesson that if we would not stagnate in error we must welcome criticism. We have learned that a patient tolerance of criticism is one condition of progress.

The veritable conflict of the past has been between enlightenment and ignorance; between true religion (the residue left after countless onslaughts of heresy) and false; between true science (again, a residue) and pretended. The issue has been along the road that we call progress—the residue of insight and acquirement left to us after the experience of the ages. We have at last learned that even our divagations from the straight path are not all in vain; that our teaching comes through our errors. Men of genius commit their errors but once; they become our leaders because they learn more quickly; our own errors are countless, are ceaselessly committed, and it may be, in time, corrected. All that we have acquired has come direct to us from such leaders; all that the mass of men have learned is to glean the fragments the leaders let fall, and to have a patient, or it may be frivolous, tolerance of novel ideas and of suggested change. Leaders who have escaped martyrdom of one sort or another we may account unusually fortunate, or exceptionally adroit.

Looking backwards, then, over the centuries we see perpetual conflict with ignorance, perpetual struggle in both the physical and the

spiritual worlds; and specifically a struggle in one world between true and false science, in another between religion and the heresy of the time. If we survey the whole of history at a glance we see that the science of one epoch has often been at variance with the religion of another; but we also see that in each and every age the conflict has been between things of one and the same kind; between religion and its opposite, between science and its opposite; and not in general between things so different in their nature as science and religion.

The histories of the so-called 'martyrs of Science' should be interpreted in the light of the foregoing conclusions. It may be that some readers, even while admitting the argument here set down, will leave it with an uneasy feeling that it can not, after all, be correct. It differs from received opinion. It is so much at variance with the views expounded in books of the warfare-of-science sort. But *is it?* As to opinion, I will quote a phrase of Kepler's:

The whole of philosophy is nothing but innovation, and a combat with immemorial ignorance.

Kepler was in the thick of the fight and knew that of which he spoke. He blames ignorance and not religion, nor theology. As to the real teaching of the books in question, I will quote two paragraphs from President White's 'Warfare of Science with Theology in Christendom.'

I. Nothing is more unjust than to cast especial blame for all this resistance to science upon the Roman Church. The Protestant Church, though rarely able to be so severe, has been more blameworthy.

II. As to the older errors the whole civilized world was at fault, Protestant as well as Catholic. It was not the fault of Religion; it was the fault of that short-sighted linking of theological dogmas to scriptural texts, which in utter defiance of the words and works of the Blessed Founder of Christianity, narrow-minded, loud-voiced men are ever prone to substitute for Religion.

The first citation is amply proved in the book from which it is taken. The second lays the blame precisely where it belongs, namely, upon the whole civilized—that is, partly civilized—world. The conflict was the outcome of invincible ignorance; it was an episode in the progress towards enlightenment. It had nothing to do with religion—Dr. White so states. That it had nothing to do with theology will be clear when we reflect that the particular form of men's theology determined only the particular manner in which their ignorance was manifested. Catholics chose one form; Protestants another. The real cause underlaid theological form; and was the ignorance of 'narrow-minded' men. It was independent of 'scriptural texts,' though they were often quoted to serve a purpose. From Dr. White's own words it appears that the conflicts of science have not been, in general, with religion, nor yet with theology; but with the 'immemorial ignorance' of 'narrow-minded men,' recognized as the arch-enemy by Kepler, the protagonist, and recognizable all about us to-day, if we will but look.

Author Holder Edward Singleton

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